

RESPONSE UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
TECHNOLOGY CENTER 1753

Attorney Docket No. **09792909-5802**

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Takeshi Nogami, et al.

Application No. **10/775,935**

Filed: **February 10, 2004**

For: SEMICONDUCTOR MANUFACTURING
APPARATUS AND METHOD FOR
MANUFACTURING SEMICONDUCTOR
DEVICES

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) Group Art Unit: **1753**
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) Confirmation No.: **3159**
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) Examiner: **Luan V. Van**
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Commissioner for Patents
P.O. Box 1450
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RESPONSE TO AUGUST 21, 2007 FINAL OFFICE ACTION

Dear Sir:

Pursuant to 37 C.F.R. § 1.116, this Amendment is submitted in response to the Final Office Action mailed August 21, 2007. Applicants respectfully request reconsideration of the application in view of this amendment and remarks herein.

IN THE CLAIMS

This listing of claims replaces all prior listings:

1. (Cancelled)
2. (Currently Amended) A semiconductor manufacturing apparatus comprising:
an electrolytic plating chamber with which an electrolytic plating apparatus responsible for electrolytic plating of a substrate is constructed;
an electrolytic polishing chamber with which an electrolytic polishing apparatus responsible for electrolytic polishing of the substrate is constructed; ~~and~~
an electroless plating chamber with which an electroless plating apparatus responsible for electroless plating the substrate is constructed;
a liquid treatment chamber with which a liquid treatment apparatus responsible for liquid treating the substrate is constructed;
an annealing chamber with which an annealing apparatus responsible for annealing of the substrate is constructed; and
a conveying chamber having installed therein a conveying instrument responsible for loading/unloading of the substrate to or from each one of said electrolytic plating chamber chambers ~~and to or from said electrolytic polishing chamber~~, and being connected respectively to each one of said electrolytic plating chamber chambers ~~and said electrolytic polishing chamber~~, said conveying chamber being centrally located therebetween the chambers which are positioned to form a polygonal shape,
wherein,
said electrolytic plating chamber with which the electrolytic plating apparatus is constructed comprises:
a holder for holding the substrate;
a cup provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder;

a nozzle provided outside of said cup and affixed on a peripheral sidewall of said chamber for supplying the process liquid onto a surface of the substrate held by said holder; and
an inlet portion and an outlet portion, both provided through peripheral walls of said chamber, for supplying gas into and removing gas out of said chamber, respectively, and said inlet portion being distinct from said nozzle.

3. (Original) The semiconductor manufacturing apparatus as claimed in Claim 2, wherein said process liquid comprises a cleaning liquid.

4. (Currently Amended) A semiconductor manufacturing apparatus comprising:
an electrolytic plating chamber with which an electrolytic plating apparatus responsible for electrolytic plating of a substrate is constructed;

an electrolytic polishing chamber with which an electrolytic polishing apparatus responsible for electrolytic polishing of the substrate is constructed; and

an electroless plating chamber with which an electroless plating apparatus responsible for electroless plating the substrate is constructed;

a liquid treatment chamber with which a liquid treatment apparatus responsible for liquid treating the substrate is constructed;

an annealing chamber with which an annealing apparatus responsible for annealing of the substrate is constructed; and

a conveying chamber having installed therein a conveying instrument responsible for loading/unloading of the substrate to or from each one of said electrolytic plating chamber chambers, and to or from said electrolytic polishing chamber, and being connected respectively to each one of said electrolytic plating chamber chambers and said electrolytic polishing chamber, said conveying chamber being centrally located therebetween the chambers which are positioned to form a polygonal shape,

wherein,

said electrolytic polishing chamber with which the electrolytic polishing apparatus is constructed comprises:

a holder for holding the substrate;

a cup provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic polishing solution can be filled, together with the substrate held by said holder;

a nozzle provided outside of said cup and affixed on a peripheral sidewall of said chamber for supplying the process liquid onto a surface of the substrate held by said holder; and

an inlet portion and an outlet portion, both provided through peripheral walls of said chamber, for supplying gas into and removing gas out of said chamber, respectively, and said inlet portion being distinct from said nozzle.

5. (Previously Presented) The semiconductor manufacturing apparatus as claimed in Claim 4, wherein said nozzle for supplying the process liquid comprises:

a nozzle provided outside of said cup for supplying a cleaning liquid onto the surface of the substrate; and

a nozzle provided outside of said cup for supplying an etching solution onto the surface of the substrate.

6. (Currently Amended) A semiconductor manufacturing apparatus comprising:
an electrolytic plating chamber with which an electrolytic plating apparatus responsible for electrolytic plating of a substrate is constructed;

an electrolytic polishing chamber with which an electrolytic polishing apparatus responsible for electrolytic polishing of the substrate is constructed; and

an electroless plating chamber with which an electroless plating apparatus responsible for electroless plating the substrate is constructed;

a liquid treatment chamber with which a liquid treatment apparatus responsible for liquid treating the substrate is constructed;

an annealing chamber with which an annealing apparatus responsible for annealing of the substrate is constructed; and

a conveying chamber having installed therein a conveying instrument responsible for loading/unloading of the substrate to or from each one of said electrolytic plating chamber chambers, ~~and to or from said electrolytic polishing chamber~~, and being connected respectively

to each one of said electrolytic plating chamber chambers and said electrolytic polishing chamber, said conveying chamber being centrally located therebetween the chambers which are positioned to form a polygonal shape,

wherein,

said liquid treatment chamber comprises:

a holder for holding the substrate,

a cup provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder,

a nozzle provided outside of said cup and affixed on a peripheral sidewall of said chamber for supplying the process liquid onto a surface of the substrate held by said holder; and

an inlet portion and an outlet portion, both provided through peripheral walls of said chamber, for supplying gas into and removing gas out of said chamber, respectively, and said inlet portion being distinct from said nozzle.

7. – 8. (Cancelled)

9. (Previously Presented) The semiconductor manufacturing apparatus as claimed in Claim 6, wherein said nozzle for supplying the process liquid comprises:

a nozzle provided outside of said cup for supplying a cleaning liquid onto the surface of the substrate; and

a nozzle provided outside of said cup for supplying an etching solution onto the surface of the substrate.

10. (Previously Presented) The semiconductor manufacturing apparatus as claimed in Claim 6, wherein said electrolytic plating chamber with which the electrolytic plating apparatus is constructed comprises:

a holder for holding the substrate;

a cup provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic plating solution can be filled, together with the substrate held by said holder; and

a nozzle provided outside of said cup for supplying a process liquid onto a surface of the substrate held by said holder.

11. (Original) The semiconductor manufacturing apparatus as claimed in Claim 10, wherein said process liquid comprises a cleaning liquid.

12. (Previously Presented) The semiconductor manufacturing apparatus as claimed in Claim 6, wherein said electrolytic polishing chamber with which the electrolytic polishing apparatus is constructed comprises:

a holder for holding the substrate;

a cup provided so as to oppose to said holder and is capable of forming a closed space, into which an electrolytic polishing solution can be filled, together with the substrate held by said holder; and

a nozzle provided outside of said cup for supplying a process liquid onto a surface of the substrate held by said holder.

13. (Previously Presented) The semiconductor manufacturing apparatus as claimed in Claim 12, wherein said nozzle for supplying the process liquid comprises:

a nozzle provided outside of said cup for supplying a cleaning liquid onto a surface of the substrate; and

a nozzle provided outside of said cup for supplying an etching solution onto a surface of the substrate.

14. – 18. (Cancelled)

REMARKS

Claims 2-7 and 9-13 are pending and under consideration in the above-identified application.

In the Office Action, Claims 2-7 and 9-13 were rejected.

In this Amendment, Claims 2, 4 and 6 are amended, and Claim 7 is cancelled. No new matter has been introduced as a result of this Amendment.

Accordingly, Claims 2- 6 and 9 -13 are at issue.

I. 35 U.S.C. § 103 Obviousness Rejection of Claims 2-5

Claims 2-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Ting et al. (“*Ting*”) in view of Cheung et al. (“*Cheung*”) (U.S. Patent No. 6,136,163) and Poag et al. (“*Poag*”) (U.S. Patent No. 6,197,123). Although Applicants respectfully traverse this rejection, Claims 2 and 4 have been amended to clarify the invention and remove any ambiguities that may have been at the basis of this rejection. .

Claim 2 is directed to a semiconductor manufacturing apparatus. As amended, Claim 2 recites that the apparatus comprises an electrolytic plating chamber, an electrolytic polishing chamber, *an electroless plating chamber, a liquid treatment chamber, an annealing chamber,* and a conveying chamber having installed therein a conveying instrument responsible for loading/unloading of the substrate to or from each one of said chambers, connected respectively to each one of said chambers, and *centrally located therebetween the chambers which are positioned to form a polygonal shape.*

This is unlike *Ting*, *Cheung* and *Poag*. None of these cited references, either alone or in combination with each other, disclose or suggest a semiconductor manufacturing apparatus comprising at least the above mentioned features of Claim 2. That is, a semiconductor manufacturing apparatus which has a plurality of chambers, each configured with a corresponding apparatus that performs a specific semiconductor manufacturing activity, and a conveying chamber which has a conveying instrument responsible for loading/unloading of the substrate to or from each one of these chambers, is connected respectively to each one of these chambers, and is centrally located therebetween these chambers which are positioned to form a polygonal shape.

As such, Claim 2 is patentable over *Ting, Cheung* in view of *Poag*, as is dependent Claim 3, for at least the same reasons.

Independent Claim 4, which has been amended to recite the same distinguishable limitation as that of Claim 2, is also patentable over these cited references, as is Claim 5, for at least the same reasons.

Accordingly, Applicants respectfully request that this claim rejection be withdrawn.

II. 35 U.S.C. § 103 Obviousness Rejection of Claims 6, 7 and 9-13

Claims 6, 7 and 9-13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Ting* in view of *Cheung, Maydan*, and *Poag*. Applicants respectfully traverse this rejection.

Independent Claim 6, which has been amended to recite the same distinguishable limitation as that of Claim 2, is also patentable over *Ting, Cheung* in view of *Poag*.

Moreover, in addition to *Ting, Cheung, Poag, Maydan* also fails to teach or suggest the above discussed distinguishable limitation. As such, no combination of the cited references fairly teaches or suggests the subject matter of Claim 6. Thus, Claim 6 is patentable over *Ting, Cheung, Poag*, and *Maydan*, as are dependent Claims 7 and 9-13 at least the same reasons.


Accordingly, Applicants respectfully request that this claim rejection be withdrawn.

III. Conclusion

In view of the above amendments and remarks, Applicant submits that all claims are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

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